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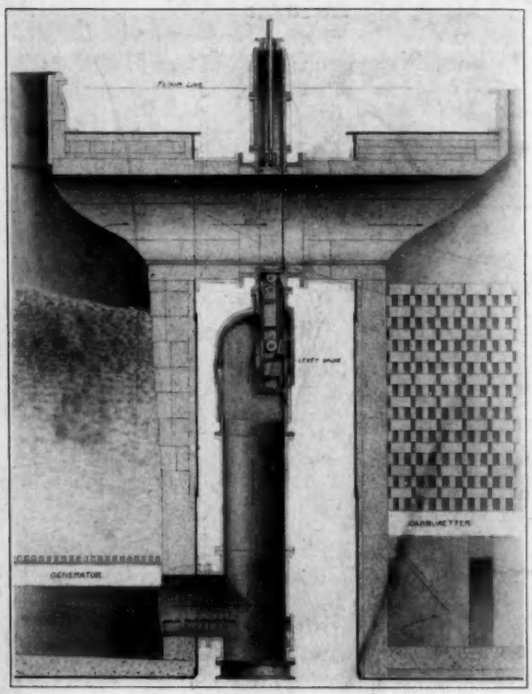

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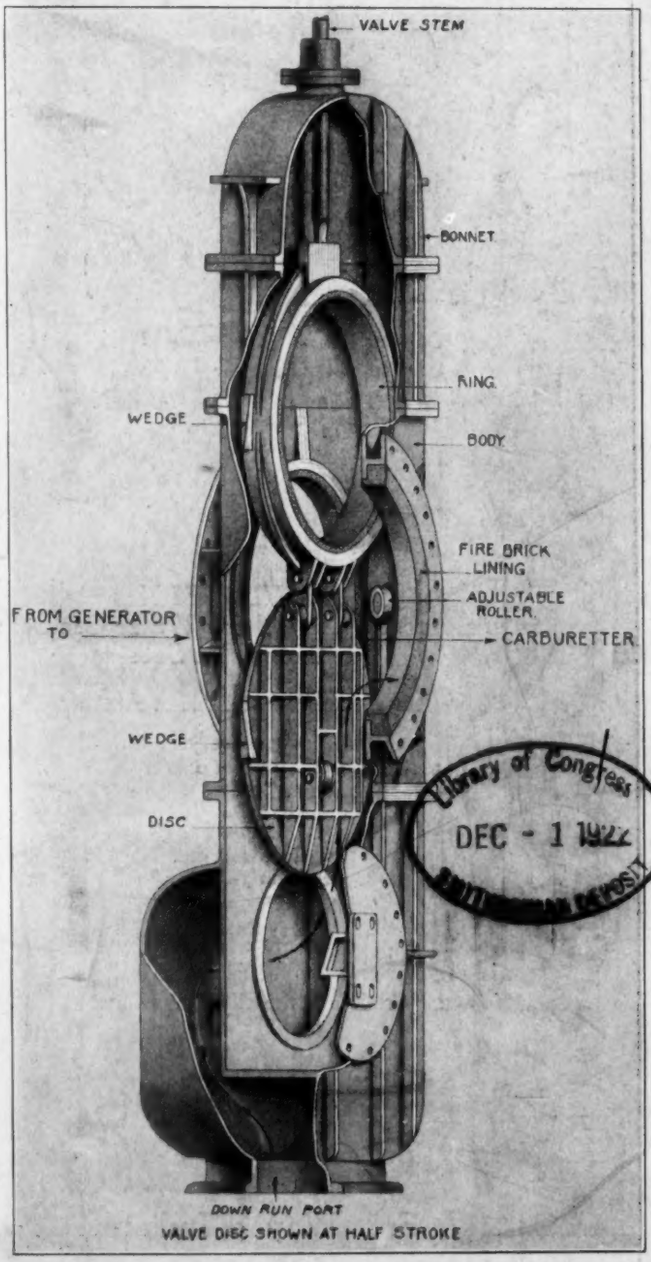

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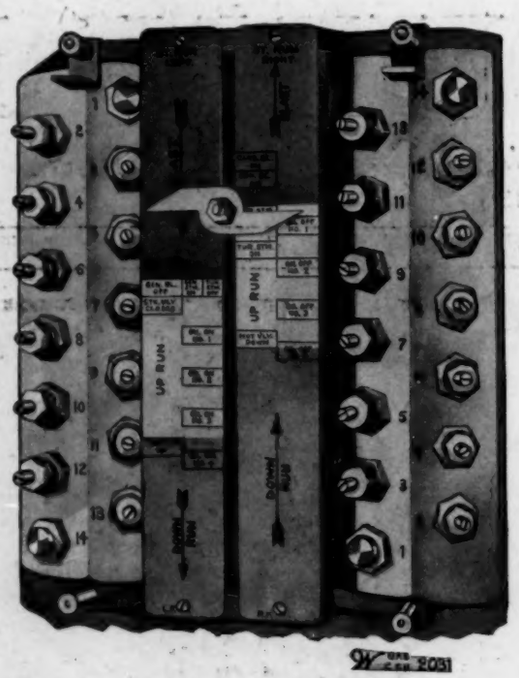

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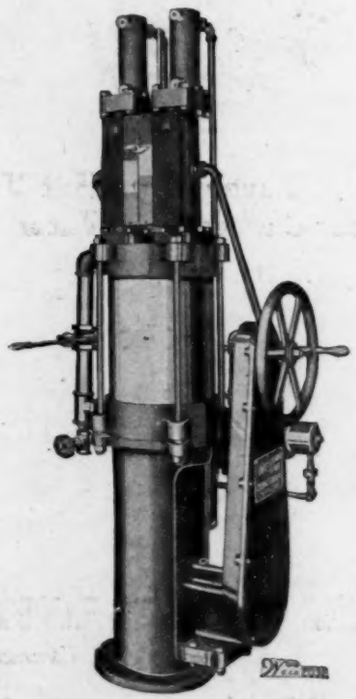

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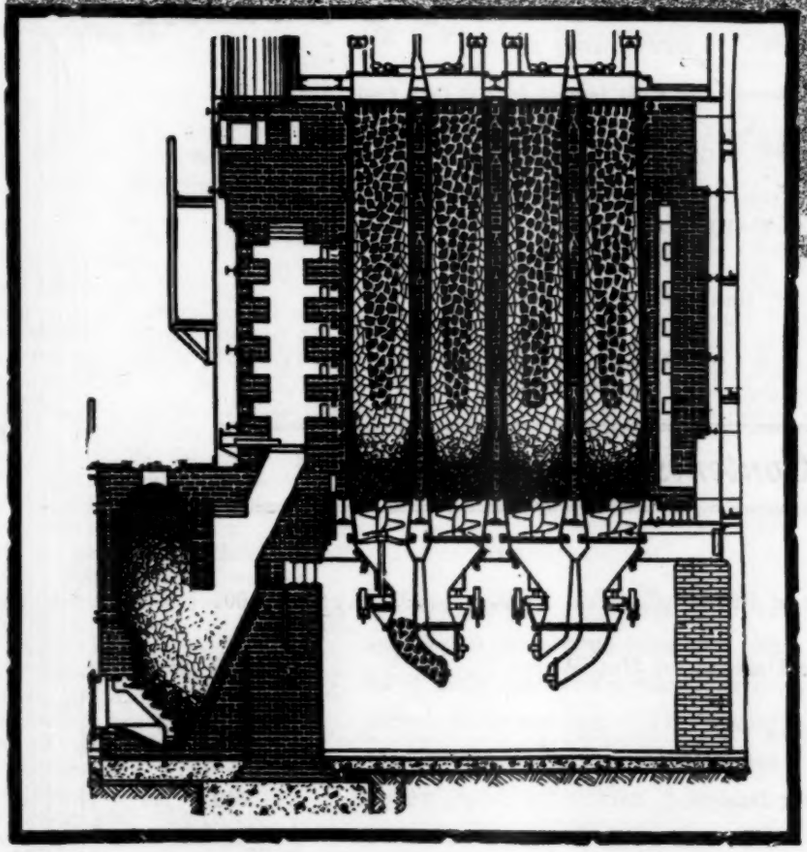

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American Gas Journal

SIXTY-THIRD YEAR

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"The Mechanics of Publicity"

Routine That Should Be Followed in Placing "Copy" with Newspapers

Gasmen are beginning to realize more and more the value and importance of utilizing trained newspaper men for publicity purposes. Reports from many sections of the country would seem to indicate a widespread interest throughout the industry in proper exploitation, and it is being brought home with telling effect that in this branch of endeavor the man who has had actual experience on a daily newspaper, be it metropolitan or small town, is the man best suited to properly handle this sort of work. And work it is—an art, rather—in which a thorough training and vast experience is a prime essential.

During the recent convention of the gas association in Atlantic City, stress was laid by a number of speakers, and in numerous papers read before the publicity and advertising and the commercial sections, meeting in joint session, upon the importance of proper publicity and advertising as applied to the gas industry. It was pointed out that a number of the large producers, and a great many of the appliance concerns throughout the United States had engaged trained newspaper men for the heads of their promotion or publicity departments, and that unquestioned results were being obtained. So strongly and so emphatically was this point driven home that during the few weeks that have elapsed since the convention there has been a demand from many sources for qualified newspaper men to affiliate with various sections of the industry.

This article is printed in response to numerous requests that have been received asking for detailed information. The article was written by a trained newspaper man who also for many years was a publicity man. The ideas advanced are worth following.—Editor.

In the preparation of newspaper publicity there are a great many mechanics essential. To properly prepare and place a story in a daily newspaper, especially a metropolitan daily, requires the services of a man who is thoroughly familiar with the newspaper game, its requirements and, what is more, a man who knows what "news" is. Too many so-called publicity men are prone to submit for publication matter that contains not the slightest iota of news interest. In other words, their material is so frankly propaganda that it usually finds its way into the waste basket—where it properly belongs. In order to secure real newspaper publicity it is vitally essential that one have something with at least a semblance of "news" value concerning which to write. Managing or city editors of newspapers are little likely to be misled by frankly propaganda "stories." They are old heads at the game, and unless a publicity man writes and submits something of at least small merit he has little or no chance of seeing it in print. Trained newspaper writers are well aware of these facts and, while it is true that every press or publicity agent may at some time or another try to "slip one over," he knows full well that if he sticks to legitimate news he is bound to find representation in the columns of the better class journals.

How to Prepare Publicity

"The mechanics of publicity" are many and varied. It is not sufficient that a publicity man have a "story." It must be prepared in such style and manner, and be so written as to attract immediately the news instinct of the busy editor to whom it is submitted. Publicity "copy," which is the technical or newspaper name for "news" of this nature, must be sent out clean, concise and to the point. Slipshop methods are taboo, and many a good story finds its way to the waste basket because it is illegibly written, finger-marked, too full of adjectives, or carelessly prepared. A trained newspaper man can tell at a glance whether "copy" sent into him has been prepared by one of his own craft. The work of the amateur is readily discernible, and in practically every instance meets a rapid death or, in newspaper parlance, is "spiked."

The writer has long been an ardent desciple of

"clean copy," and cannot impress too strongly the advisability of the plan being emulated by fellow craftsmen. Clean copy may not always "land" in the newspapers, but one thing is certain—"dirty" copy never will.

Of course, the prime essential in publicity that is intended to reach the public through the medium of the daily newspaper is the "story." Its preparation for the press is equally important; likewise the method in submitting it for publication. Naturally there are no two publicity men extant who would be likely to prepare a piece of newspaper publicity copy in the same way, as regards construction of the "story." That, it must be realized, is purely a matter of individual style. But it is in the preparation of the "copy" that a uniformity of style can easily be reached.

Clean Copy Is Essential

Even experienced newspaper men sometimes are prone to make mistakes. Typographical errors may frequently creep into a story as it is being written; in fact, it may be necessary to write and rewrite a "yarn" several times before it finally meets with the writer's approval as being suitable for submission. Once the story has been written, it is only a question of system before it eventually finds its way into the newspaper columns. A finished or "perfect" copy is first written. In the preparation of this care should be exercised to avoid typographical or grammatical mistakes. Of course, it is highly essential that newspaper "copy" be typewritten. Manuscript nowadays rarely finds its way into the editorial sanctum, and only on rarer occasions is it likely to find its way into print. In the preparation of newspaper copy it is highly desirable to use a good grade of white paper, of the long letterhead size, but of a much lighter weight.

Newspaper editors like to know to whom they are indebted for a publicity story (they are, as a rule, more or less acquainted with press and publicity agents), and for this reason it is desirable that the name of the writer be typed in the upper left-hand corner of the page, with the word "from" preceding the name. Then below—single spaced on the typewriter—should be a line indicating the nature of the story or the concern to which it applies, with another typed line immediately below, giving the address from which the story emanates. In the upper right-hand corner the day or date when the story is "released" for publication should be written, or, if there is no time limit, it should be specified that the story is for "immediate release."

"Copy" Should Not Be Crowded

Across the top of the "story," in caps, should be written a head to designate the nature of the story. A triple space on the typewriter, and the story itself is commenced. In writing newspaper "copy" it is most essential that plenty of white margin be left on either side the page, and under no circumstances should the body matter be written single space—triple space even is desirable.

Unless the story is one of extreme importance, and requiring unusual length in which to unfold, it is advisable that the "yarn" be confined to a single page of paper. In order to accomplish this the last few lines of the story may be single spaced, but this should be done only in extreme cases.

The various subjects treated in a story should be paragraphed, and all punctuations and capitalization should be plainly indicated. While it is true the editor or copy reader (in the case of a metropolitan newspaper or magazine) will read the story if it is to be published, and will make any necessary corrections, it is very wise to make this work as light as possible. No words or sentences in a publicity story should be capitalized, excepting, of course, the first letter of proper nouns, and the beginning of each sentence. Few, if any regular newspapers go in for this style of emphasis.

At the conclusion of the story a series of marks should be inserted below the concluding line, to indicate no more is to be looked for. Another fact, which few publicists who are not trained in newspaper work are aware of, is that it is bad policy to split a word at the end of a page, in the event of the story running over to a second or extra page. Additional pages of a story should be plainly numbered, in the upper left-hand corner, so that they can readily be identified by the editor who handles them.

Duplicating the Story

Excepting in the case of a "special" or "exclusive" story, it is customary to duplicate a publicity story to other newspapers, sometimes to publications all over the United States and Canada, to the extent of many hundreds. This means that the story must be multigraphed or mimeographed. The finished or "perfect" copy of the story should be turned over to the mimeographer, with instructions to run as many copies as are desired. A stencil will be cut, and, by the way, many publicity stories are "killed" because of faulty or improper stencils. Care should be taken in the cutting of the stencil that no mistakes are made, that sufficient margin is allowed, and that the proper allowance is made for all body matter being reproduced upon the paper upon which the story will go out.

The next step in the preparation of publicity is the addressing of envelopes. It is desirable that the long or legal size envelope be used, and they should be addressed upon the typewriter, or by means of an addressing machine. It is desirable, though not essential, that there appear printed on the upper left-hand corner of the envelope the name and address of the concern from whom the publicity is received. The envelopes should be addressed either to the managing editor or the city editor (the use of the editor's name is desirable, if known), followed by the name of the newspaper, and the city and State. Having received the mimeographed or multigraphed "story," it should be folded so as to fit easily within the envelope, and then the containers sealed.

Personal Delivery Desired

For the local newspapers, and when the conditions warrant or permit, the story should be taken personally to the office of the editor, either by the publicity man himself, or by an assistant or messenger boy. Sometimes it will be possible for the publicity man to secure an audience with the editor, and he may then

personally deliver his story, by doing which he knows beyond question that it has reached its proper destination. This is seldom possible in the larger metropolitan cities, but in the smaller cities and towns a live publicity man should have little or no difficulty in securing an audience. At the same time, it will enable him to have a personal chat with the editor, during the course of which he may bring pressure to bear that will result in the certain publication of his "yarn."

Assuming that the story is of more than local interest, it is to be duplicated to newspapers throughout the entire country. By all means place a two-cent postage stamp on the envelope. A one-cent stamp will carry the story in an unsealed envelope, but a two-cent stamp is bound to attract more attention in a newspaper office that a letter with the one-cent postage. The latter is a certain indication that the matter contained therein is of a circular nature, and quite frequently is discarded without so much as a glance. Once a publicity story is in the mail, or in the hands of a newspaper, there is nothing left for the publicity man to do but to await its appearance in print. If 10 per cent of the newspapers to which the story has been sent print it, or even a portion of it, the publicity man may well consider that he has "put the story across."

Broadcasting a Story

In the broadcasting of a publicity story, it is sometimes advisable to send a different version of the same yarn to different newspapers, in order to avoid duplication. Or it may be that the publicity man may desire to send only a brief outline of his story to newspapers published at distant points. All that will be necessary in such event is to proceed with each different story or version of a story as with the original, treating each different piece of "copy" as an individual story, and the same results are certain to be brought about.

Above all things to be remembered by the publicity man is that "faking," or deliberately misrepresenting, is certain to prove disastrous. A "fake" story may find its way into print. But newspaper editors have an uncanny way of finding out when they have been tricked, and woe unto the perpetrator when such a thing happens. Not only can he never again break into print in that particular journal, but he runs the risk of having his entire career ruined, because the facts are bound to be spread, and it will be only a question of time before he faces a blacklist, from which he can never hope to recover.

Ascertaining the Demand for Hot Water *

Determining Sizes and Types to Meet It

The subject has within it so many phases of benefit to the craft and the suggestions for standardized practice so extended, that this report will deal in only two phases, which may be entitled, "Ascertaining the Demand" and "Determining Sizes and Types of Apparatus" to meet it.

Many excellent gas-burning appliances are made for heating water. These may be generally divided into four classes:

1. The side attached circulating tank heater.
2. The instantaneous automatic water heater.
3. The combination storage boiler having the boiler and burner integrally connected.
4. The standard separate storage heater, which again may be divided into two classes:

(a) The multi-copper coil storage heater,

(b) Cast iron sectional storage heater.

Both of these are intended to be connected to a separate boiler.

All these heaters are made in various sizes to fill different demands:

The Circulating Side Tank Heater.—These are usually made with copper coils varying in length from twelve to thirty-five feet. There are, however, some of this type which contain cast iron heating units. Heaters having less than twenty feet of coil should not be encouraged. They are usually offered as competitive heaters and are not beneficial to the craft. Heaters up to twenty-five feet of coil should go on nothing larger than forty-gallon boilers and thirty-gallon boilers are preferable. Heaters with longer coils may be used on boilers up to fifty or sixty gallons.

Instantaneous Automatic Heaters.—These are made in various sizes for supplying hot water for a large number of uses, varying from very small homes up to fair sized apartments, houses, hotels, factories, etc.

Where the piping, for any use, is not spread over too great distances from the heater and where the peak minute demand is not too great, these types will furnish hot water at a lower cost per gallon than any other type of heater made and furnish an inexhaustible supply.

Combination Boilers.—These are made in various sizes, ranging from twelve gallons up to approximately 200 gallons, and are supplied both for hand operation and with thermostat for automatic operation. The greatest sale of this type of apparatus seems to be for unit apartments and homes, or for hot water needs of a similar needed capacity.

Storage Heaters.—(a) Multi-Copper Coil Storage Heaters.—These are made in various sizes ranging from fifty gallons to 500 gallons per hour capacity, and are always connected to separate boilers and are used for any purpose where hot water is needed and where, due to long runs of piping, needing a circulating system of piping, excessive minute peak demand, or low water pressure conditions, occur. These are nearly always supplied for thermostatic automatic action.

(b) Cast Iron Sectional Storage Heaters.—These are made in various sizes, but are usually used for boilers from 200 gal. upward. These are made for hand operation or thermostatic automatic operations, as desired.

A number of most commonly met demands are at-

*Report presented at last meeting of Pacific Coast Gas Association by C. S. Aronson, L. Cinq-Mars, M. J. Purcell and H. A. Basford, chairman

tached to this report, with general method of determining the demand and application.

Special information as to sizes, capacities, measurements and gas consumption may be secured from the different manufacturers.

Lodging Houses and Small Hotels.—Figure the number of basins by one gallon per person per time used. Figure the number of baths by sixteen gallons of hot water per bath taken.

Candy Stores.—Without restaurant additions or only sandwiches, etc., served and no outside catering, use small storage systems, tank heaters or automatic heaters, according to class of store and ability to purchase.

For better class stores, instantaneous automatic heaters are best, being careful to see they are of such size that they are not overworked.

In a very large candy store, with restaurant additions, larger storage systems of ample size should be used—larger heaters with comparatively small boilers are preferable.

Restaurants.—Excepting small ones and lunch counters, see "Large Candy Stores."

Where large constant demand for hot water is found, large storage systems are preferable, due to the excessive condensation found in instantaneous heaters under such conditions and because the minute demand may be greater than the capacity of heater, thereby making a reserve or boiler supply necesssary.

Where, however, main supply is heated by steam, an instantaneous automatic heater supplies the auxiliary demand perfectly.

Factories.—This demand is so varied that it is necessary to figure each job on its merits, having in mind the following:

1. Number of wash sinks.
2. Number of employees (one gallon per person).
3. Whether sinks are widely separated over building or close together.
4. The necessity of a circulating system of piping.
5. What other uses there are for hot water:
   (a) Showers.
   (b) Use for manufacturing.
   (c) Janitor work, etc.

Schools.—(a) Janitors' Lavatories.—These must be figured as intermittent use and may be supplied from a central system, but if not too widely separated, it is more economical to supply them with a separate instantaneous automatic heater.

(b) Gymnasiums.—Figure four gallons hot water per shower per pupil; as pupils usually shower by class, a boiler storage system is necessary, with boiler of sufficient size to take care of demand per pupil as above.

(c) Domestic Science Departments.—Usually a cottage size instantaneous automatic heater is best—increasing to standard sizes if in a very large school. It is more economical to have this hot water system separate from any other supply and visualized the modern gas hot water system to the pupils.

Homes or Apartments.—Given the different fixtures, figure number of baths, number of basins, number of laundry trays, number of kitchen sinks.

Instantaneous Automatic Water Heaters

Gallons per Minute Delivered by Ordinary Plumbing Fixtures.—While compiled from actual tests, this table is not guaranteed, as fixtures even of the same manufacture vary somewhat, and the flow is affected by many variable factors:

Fixture	Fair Flow	Good Flow	Excellent Flow
Kitchen sink bibbs	2	4	6
Pantry sink—high goose neck bibbs	2	2	3
Pantry sink—large plain bibbs.	4	6	8
Vegetable sink bibbs	2	4	6
Laundry tray bibbs	4	6	8
Slop sink bibbs	3	4	6
Lavatory basin bibbs	2	3	4
Bath tub bibbs	3	4	6
Shampoo spray	½	1	2
Liver spray	1	2	3
Five-inch rain head shower	2	3	4
Six and a half inch rain head shower	2	3	5
Eight-inch rain head shower	4	6	8
Eight-inch tubular head shower	6	8	10
Needle baths	20	30	40
Manicure tables	1	1½	2

Sizes of Heaters—Their Application to Residences

Heaters are made in several sizes, as listed below, the size number corresponding to the capacity of the heater, raising the temperature of the water 63 deg. Fahr. with artificial gas, or 80 deg. Fahr. using natural gas.

For quick service in determining the proper size of heater for residential use, use the following table, at the same time urging the use of the accompanying tables giving capacities of the heaters and fixtures for complete installations:

Size Heaters	Gallons per Minute	Residences Having
No. 1½		Cottages, flats or apartments where fixtures are close together and only moderate demands are made.
No. 2½		
No. 3	3	One bathroom and kitchen sink, two lavatories, laundry tray.
No. 4	4	One family bathroom, one servants'. bathroom, two lavatories, kitchen and laundry.
No. 6	6	Two family bathrooms, one servants' bathroom, kitchen, pantry, laundry and three lavatories.
No. 8	8	Three or four family bathrooms, servants' bathroom, kitchen, pantry, laundry and lavatories.

For three or four room apartments assume a need of two gallons per minute per bathroom, and specify a heater having two-thirds the capacity determined, as not more than two-thirds of the faucets will be drawing water simultaneously. Thus an apartment house with six one-bathroom apartments would need twelve gallons per minute. A No. 8 heater would answer this requirement.

Model Specifications for Instantaneous Automatic Water Heaters

Furnish and install complete where shown on plans (see note No. 1) one (or the number of heaters desired) (see note No 2) No. —— (see note No. 3) instantaneous automatic water heater (or heaters) to operate on a minimum water pressure of twelve pounds per square inch at the highest hot water outlet (see note No. 4).

Gas Connection.—Run a separate gas line of —— inches (see note No. 5) black pipe direct from gas meter to gas inlet of heater, placing flat head ground gas cock and union of same size as line in the line close to heater, with the union between the cock and heater.

Flue Connection.—Connect vent of heater to chimney hole marked on plans, using —— inch pipe (see note No. 6), made of No. —— (insert gauge of iron wanted) black (or galvanized) iron. Place draft hood furnished with heater in the vertical run of pipe above heater just below the elbow.

Cold Water Connection (for Direct System of Installation).—Run cold water line of —— inch (see note No. 7) galvanized iron pipe from the cold water main of house at a point nearest to heater direct to heater cold water inlet, placing globe valve and union of the same size as line in the line, with the union between the globe valve and the heater inlet.

Cold Water Connection (for Reheating System of Installation).—Run line from a point on the hot water line after it leaves the boiler, and before the first branch is taken off, direct to heater inlet of —— inch (see note No. 7) galvanized iron pipe placing in the line a globe valve and union of the same size as the line, with the union between globe valve and heater. In the main hot water line at a convenient point between the points where the line to the heater and the first branch to a fixture are taken off, place a globe (or gate) valve of the same size as the hot water main.

Hot Water Connection.—Run hot water line of —— inch (see note No. 8) galvanized iron pipe from hot water outlet of heater direct to hot water main of house, placing in line close to the heater swing check valve and union of same size as line in perpendicular position with the union between check valve and heater.

General.—All piping must be run in such a manner as not to interfere with the removal of any parts of the heater.

Note No. 1—Location.—Heater should be located as close to the point of most frequent use as flue and other considerations will permit. In residences this point is the kitchen.

Note No. 2—Number of Heaters.—In large residences or apartments where the probable demand exceeds the capacity of No. 8 Type F heater, it may be desirable to install two or more heaters in different locations, and the piping valved so as to arrange the fixtures into compact groups, each group to be supplied from a separate heater.

Note 3—Size of Heater.—The proper size of heater may be determined from tables on preceding page. It is recommended that the selection be a size larger than that which is barely ample to fill the requirements.

Note No. 4.—Multiply the constant 0.43 by the height in feet of the highest faucet above the ground. Subtract the product from the water pressure of the street main, or, in a house tank system, from the pressure at the basement. If this information is given us, a heater exactly suitable to the working pressure will be furnished.

Note No. 5—Gas Connection.—See table below, and if the gas line is over 100 ft. long use pipe a size larger than called for.

Note No. 6—Flue.—An independent flue is desirable and should be provided in new houses. It should be located after the heater's location is determined, if possible. If necessary, the heater may be vented into a flue which vents another gas appliance.

Note No. 7—Cold Water Line.—See table below. If water pressure is low, pipe a size larger than heater inlet should be specified.

Note No. 8—Hot Water Line.—This line should not be made larger than heater outlet as given in the table below. Before hot water is delivered at the faucet, the cold water in this line must be discharged. Increasing the size of this pipe delays the delivery of hot water at the faucets proportionately. It is sometimes desirable

CAPACITIES IN GALLONS PER MINUTE DELIVERED BY INSTANTANEOUS AUTOMATIC WATER HEATERS

Size of Heater	Temperature Raise 50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°
1½	1.89	1.57	1.35	1.18	1.05	0.95	0.86	0.78	0.75	0.68	0.63
2½	3.15	2.62	2.25	1.97	1.75	1.58	1.43	1.31	1.21	1.12	1.05
3	3.78	3.15	2.70	2.36	2.10	1.89	1.72	1.58	1.45	1.35	1.26
4	5.05	4.20	3.60	3.15	2.80	2.52	2.29	2.10	1.94	1.80	1.68
6	7.58	6.30	5.40	4.73	4.20	3.87	3.52	3.23	2.98	2.76	2.58
8	10.10	8.40	7.20	6.30	5.60	5.04	4.59	4.20	3.88	3.60	3.36

SPECIFICATIONS FOR ALL SIZES OF INSTANTANEOUS AUTOMATIC HEATERS

Size	Water Inlet	Water Outlet	Gas Line	Vent Pipe	Temp. Raise Art. Gas	Temp. Raise Nat. Gas	Gas per Min.	Gas Meter
1½	½"	½"	¾"	4"	63°	80°	1½ cu. ft.	10 lgt.
2½	½"	½"	¾"	4"	63°	80°	2½ cu. ft.	10 lgt.
3	½"	½"	1 "	6"	63°	80°	3 cu. ft.	30 lgt.
4	½"	½"	1¼"	6"	63°	80°	4 cu. ft.	45 lgt.
6	¾"	¾"	1½"	7"	63°	80°	6 cu. ft	60 lgt.
8	¾"	1 "	2 "	8"	63°	80°	8 cu. ft.	80 lgt.

where large heaters are used to run a separate small line to a frequently used faucet.

Different manufacturers have different numbers for cottage size heaters, but reference to their catalogues will show similar capacities.

Storage Systems

Large Multi-Coil Storage Systems.—Supply hot water in large quantities to fulfill the severe requirements of large residences, apartments, institutions and buildings where a similar demand exists. They automatically maintain in a storage boiler sufficient hot water at the desired temperature to supply the anticipated demand by combining as a unit an insulated storage boiler of copper, black or galvanized iron, a heater and a controlling thermostatic mechanism placed in the boiler.

The operation of the system is entirely automatic, the gas being turned on and burned in the main burners of the heater whenever the temperature of the water in the tank drops below that which the thermostat is set. The gas continues to burn until the water in the tank is restored to the predetermined temperature, when the valve automatically shuts off the gas to the heater.

Small Storage Systems.—Being free from limitations of gas and water pressure conditions, small storage systems are almost universally adaptable. In that respect and in their ability to supply a fair re-current demand they are similar, except in size, to large multi-coil storage systems.

Small storage systems are built in either combination boilers or boilers and heaters separate, as units complete, ready to set up, but may be changed to suit the conditions of any particular installation.

Model installations for this class are furnished by manufacturers for direct supply and return circulation, but it should be understood that systems are adapted to all methods shown in connection with the instantaneous automatic heaters.

Common forms are tabulated:

Installed in connection with water supply under pressure from pneumatic tank.

Installed in connection with water supply from gravity tank located in attic.

Installed in connection with water supplied from range boiler.

Installed in connection with furnace coil placed in house heating plant.

Installed in connection with gas supplied from gasoline generator.

Having no water valve mechanism, these heaters lend themselves to successful use where gas and water supplies may be unfavorable, and therefore can be said to be universal in their adaptation to all conditions of plumbing.

The principle of operation is the maintenance of water in the boiler at a fixed temperature, ready for any demand. This is accomplished by the thermostat, which shuts off the gas when the water is at the degree desired and turns on the gas and permits it to burn whenever the water in the boiler needs more heat.

SIZES OF SYSTEMS

Size System	Requirements
No. 100 heater, with 80 or 100 gal. boiler	Residences having one to two bathrooms, bedroom lavatories, large kitchen sink, pantry sink and laundry. Apartment buildings with six apartments of three or four rooms each. Fifteen to twenty room hotels.
No. 200 heater, with 150 or 200 gal. boiler	Apartment buildings having six to twelve apartments of four or five rooms each. Residences having three to four bathrooms, large kitchen sink, dishwashing machine, large laundry. Twenty-five to forty room hotels.
No. 300 heater, with 250 or 300 gal. boiler	Residences having five to seven bathrooms, large kitchen sink, pantry sink, dishwashing machine, large laundry. Apartment buildings having ten to twenty apartments of four or five rooms each. Fifty to sixty room hotels.
No. 500 heater, with 425 or 500 gal. boiler	Apartment buildings having twenty to thirty apartments of five or six rooms each. Sixty to one hundred room hotels. Very large homes.

SIZES OF MULTI-COIL STORAGE HEATERS AND GALLONS PER HOUR HEATED

Size of Heater	Temperature Raise in Degrees 50°	60°	70°	80°	90°	100°	110°
No. 100 ...	126	105	90	78.8	70	63	57.2
No. 200 ...	252	210	180	157.5	140	126	114.5
No. 300 ...	378	315	270	236	210	189	172
No. 500 ...	630	525	450	394	350	315	287

Model Specification for Storage Systems

Furnish and install where shown on plans (see note No. 1) one automatic storage system, consisting of one ——— gallon (black iron, galvanized iron or copper) tank, to be supported in horizontal position on tank supporters and fitted in automatic connection with one (or two) No. —— storage heaters, using —— inch pipe as circulators between heater and tank, with —— inch gate valves and elbows in circulators, one —— inch thermostat to be placed in proper tapping in tank, and connection made between the main gas outlet of gas controlling mechanism and the main gas inlet of heater, with —— inch black pipe ,and between pilot outlet on gas controlling mechanism and pilot inlet on heater, with one-eighth inch black pipe. One thermometer to be placed in proper tapping in tank and tank to be covered with two-inch 85 per cent magnesia insulation, canvassed. System to be fitted up in exact accordance with printed directions furnished by the manufacturers.

Gas Supply.—Run a sseparate gas line of —— inch (see note No. 2) direct from gas meter to inlet of thermostat with —— inch gas cocks in the line and a union between gas cock and moment valve.

Flue Connection.—Connect vent of heater to flue as indicated on plans (see note No. 3), using —— pipe made of No. —— (insert gauge wanted) black (or galvanized) iron. Place Ruud draft hood in vertical run of pipe as high as possible.

Cold Water Supply.—Run cold water line of —— inch galvanized iron (brass or copper) pipe, direct from cold water main of building to inlet tapping of tank.

Hot Water Supply.—Run hot water line (or lines) of —— inch (see note No. 4) galvanized iron (brass or copper) pipe, from outlet tapping(s) of tank direct to hot water piping of building.

General.—All piping must be run so as not to interfere with the removal of any parts of the heater or with the thermostat, care being taken not to install the boiler so close to a wall that it will be broken if taken out of boiler.

Steam Coils (if Desired).—Tank herein specified to be fitted with copper (brass or galvanized iron) at factory before shipment, and equipped with handhole (or manhole in the iron boilers).

Note No. 1—Location.—Systems should be located as close to the point of most frequent use as flue and other considerations will permit.

Note No. 2—Gas Line.—If run of gas line is over 100 ft. long, specify it of pipe a size larger than called for in the tables.

Note No. 3—Flue.—A connection to a flue having a good draft is essential to these systems. An independent flue is desirable, and should be provided in a new building. The heater may be connected where necessary to a flue venting another gas apparatus, but in such cases it is important that the draft in the flue is sufficient to carry both appliances easily, as no damper should be used in the flue connection.

Note No. 4—Hot Water Line.—This line should not be made larger than outlet tapping of tank, unless specific conditions otherwise warrant. Unless a return circulation line is specified, the water in this line must be discharged at the faucet before hot water is delivered. Increasing the size of this pipe delays the delivery of hot water proportionately. It is sometimes desirable to run a separate small line to a frequently used faucet.

Works Connections

Report by Pacific Coast Gas Association

In assigning the work to this subcommittee the chairman of the technical committee stated:

"The work on this committee will consist in determining the proper dimension, material and methods of installation for gas works connections, with particular reference to the proper size for works capacities and apparatus.

"Two thoughts suggest themselves in this connection: One would be to send out a questionnaire to all of the company members of the Pacific Coast Gas Association, in which the size of works connections and apparatus would be given, together with the capacity of the plant as a whole, and of each apparatus in particular."

Following this suggestion, several questionnaires were sent out.

The data collected has been tabulated and forms a part of this report. It will be noted from this tabulation that there is considerable divergence in practice, as for example: A generator with 400,000 cu. ft. capacity in plant "I" has the same size generator washbox connection as a generator with half the capacity in plant "J." It was found also that there is more divergence in the formulae for gas flow in pipes by the different authorities than exist in practice among our company members.

The generally accepted formula for the flow of gas in pipes is:

$$Q = C\sqrt{\frac{Pd^5}{SL}}$$

Where Q = Rate of flow, cubic feet per hour.
P = Difference in pressure inches of water.
d = Diameter of pipe in inches.
S = Specific gravity of gas.
L = Length of pipe in feet.
C = A constant.

The value of the constant C is the only thing in the formula upon which no two authorities seem to agree. The following are some of the values which are given C in this formula:

Authority	Value of C
William Cox	2,400
Dr. Poole	2,340
King	1,350
J. P. Gill	1,291
Molesworth	1,000

Gill further complicates the formula by adding the diameter of the pipe to the length:

$$Q = 1{,}291\sqrt{\frac{d^5h}{S(L+D)}}$$

Inasmuch as the piping around gas works fouls up with tar and naphthalene, the committee recommends that the lower value of C be used in calculating pipe sizes for works connections. Even this value is not conservative enough for use for pipe that has to carry hot gases, such as the generator washbox connections. These connections must, of course, be lines for protection against temperatures ranging up to 1,800 deg., and therefore offer more resistance than smooth surfaces in addition to their fouling up and the additional resistance due to handling hot gases. In designing the generator washbox connection, it should be borne in mind that the velocity of the gas entering the washbox should be kept as low as can be consistently done or violent surging in the washbox will occur. It is the opinion of the committee that none of the formulae ordinarily used in flow calculations should be used in designing this connection, but rather follow the more liberal practice.

It was suggested to the works connections committee that an "elaborate mathematical computation in which the dimensions of piping would be computed from a formula showing the lowest cost for fixed charges and operating expense, with proper provisions for future growth" be made. There are so many variable factors in such a problem that the committee did not feel competent to undertake it. A sample chart has been included in the report which may be of some help in designing works connections other than the "hot ones" referred to above. This chart is based on Molesworth's formula for gas flow:

$$Q = 1{,}000\sqrt{\frac{d^5h}{SL}}$$

This particular chart covers four sizes of pipe, viz. 6, 8, 10 and 12 inch; three pressure differentials, viz. 1, 2 and 3 inch, of water; lengths of pipe up to 200 ft., and quantities of gas up to 200,000 cu. ft. per hour. To construct such a chart to suit a set of conditions proceed as follows:

Select a piece of accurate cross-section paper of convenient size. At the top lay out a scale beginning at zero on the left and running up to a maximum quantity of gas to be handled per hour on the right. At the bottom lay out a scale beginning at zero on the left and running up to the maximum length of pipe necessary to be used on the right. Lay out diagonal lines to represent the different size pipes, beginning at the lower left-hand corner, for all sizes, and for the other end of the lines substitute in the Molesworth formula, the pipe diameter in question, the maximum pressure drop to be tolerated, and the minimum pipe length to which this drop will apply. Select the point on the upper scale corresponding to the result obtained by the substitution and draw the line from the zero point to this point. Having drawn diagonal lines to represent all the pipe sizes to be considered, it is necessary to plot the pressure drop curves. The points on these curves, which are parabolas, are gotton by substituting various assumed value for Q and solving for L. Project vertically from the assumed value of Q to the pipe size, then project horizontally to the intersection of the vertical projection from the L gotten by solving the equation. The intersection will be a point on the curve of pressure drop.

TABULATION OF DATA - WORKS CONNECTIONS 1922 P.G.A. SHEET 1

PLANT	NO OF GENERATORS	DAILY CAPACITY OF GENERATORS M.C.F.	GENERATOR-WASH BOX CONNECTIONS DIAM.	GENERATOR-WASH BOX CONNECTIONS LENGTH	DAILY CAPACITY OF PLANT M.C.F.	WASH-BOX - SCRUBBER CONN. DIAM.	WASH-BOX - SCRUBBER CONN. LENGTH	SCRUBBER-RELIEF HOLDER CONN. DIAM.	SCRUBBER-RELIEF HOLDER CONN. LENGTH	RELIEF HOLDER-EXHAUSTER CONN. DIAM.	RELIEF HOLDER-EXHAUSTER CONN. LENGTH	EXHAUSTER-OIL SCRUBBER CONN. DIAM.	EXHAUSTER-OIL SCRUBBER CONN. LENGTH	EXHAUSTER-PURIFIER CONN. DIAM.	EXHAUSTER-PURIFIER CONN. LENGTH	OIL SCRUBBER-PURIFIER CONN. DIAM.	OIL SCRUBBER-PURIFIER CONN. LENGTH	PURIFIER-STORAGE HOLDER CONN. DIAM.	PURIFIER-STORAGE HOLDER CONN. LENGTH
A	2	200	12"x16"	5'-2"	400	16"x12"	4'	12"											
	1	420	24"	ELBOW		12"	6'												
B	1	400	20"	-	2,300	12"	-	2-16"		2-16"		2-16"	140'	2-16"	248'			16"	
	1	700	30"	-		24"	-												
	1	800	24"	-		20"	-												
C	2	1,200	20"	8'	2,400	16"	42'	16"	178'	16"	240'			16"	245'			16"	
D	2	400	14"	32"	800	12"	20	12"	38'	NOTE - NO EXHAUSTER - PIPE FROM RELIEF HOLDER TO PURIFIER				← 8"	88'			NO STORAGE HOLDER	
E	1	200	12"	6"	320	10"	6'	10"		6"								10"	
	1	120	10"	6'		6"	5'												
F	1	400																	
	1	750	30"x30"	4'	3,150	48"	16'	16"		16"		NOTE - OIL SCRUBBERS REMOVED PURIFIERS AND STORAGE HOLDERS 12"		12"	20'	12"	25'	12"	
	1	2,000																	
G	1	240	16"	ELBOW	840	24"	12'	16"	12'	12"		12"	30'	12"	181'			12"	
		600	16"																
H	8	2,000	24"	8'	16,000	36"	4'	36"x42"		36"		36"	230'	30"	280'			30"	
I	1	400	12"	11'	600	10"	5'-6"	8"	14'										
	1	200						← 8" COLLECTION MAIN -		POSSIBLY TWO CONNECTIONS TO PURIFIERS							145'	10"	
J	2	300	12"	3'	600	12"	18'	8"		6"		6"		6"	30'	6"	6'		
	1	800	16"	6'		16"	10'	16"											
K	1	1,320	20"	4'	4,180	20"	21'	16"		16"		2-16"	92'+61'					16"	55'	16"	
	1	1,980	36"	10'		42"	14'	16"											
L	2	3,000	30"x30"	6'	6,000	48"		24"		24"		30"	60'					24"	29'	24"	
M	4	5,000	36"x36"	6'	29,000	60"	14'	30"x20"		30"				32"						2-24"	
	3	3,000	30"x36"																

The Fourth Variable from the Chart

With any three variables known the fourth can be taken from the chart up to its limitations; for example:

Given a gas flow of 70,000 per hour, 100 ft. of pipe, and a pressure drop of 1" to find the size of pipe. Project vertically from 100 ft. to the 1" pressure drop curve at A, then horizontally to intersect the vertical projection from 70,000 at B. The size of the pipe required is twelve-inch.

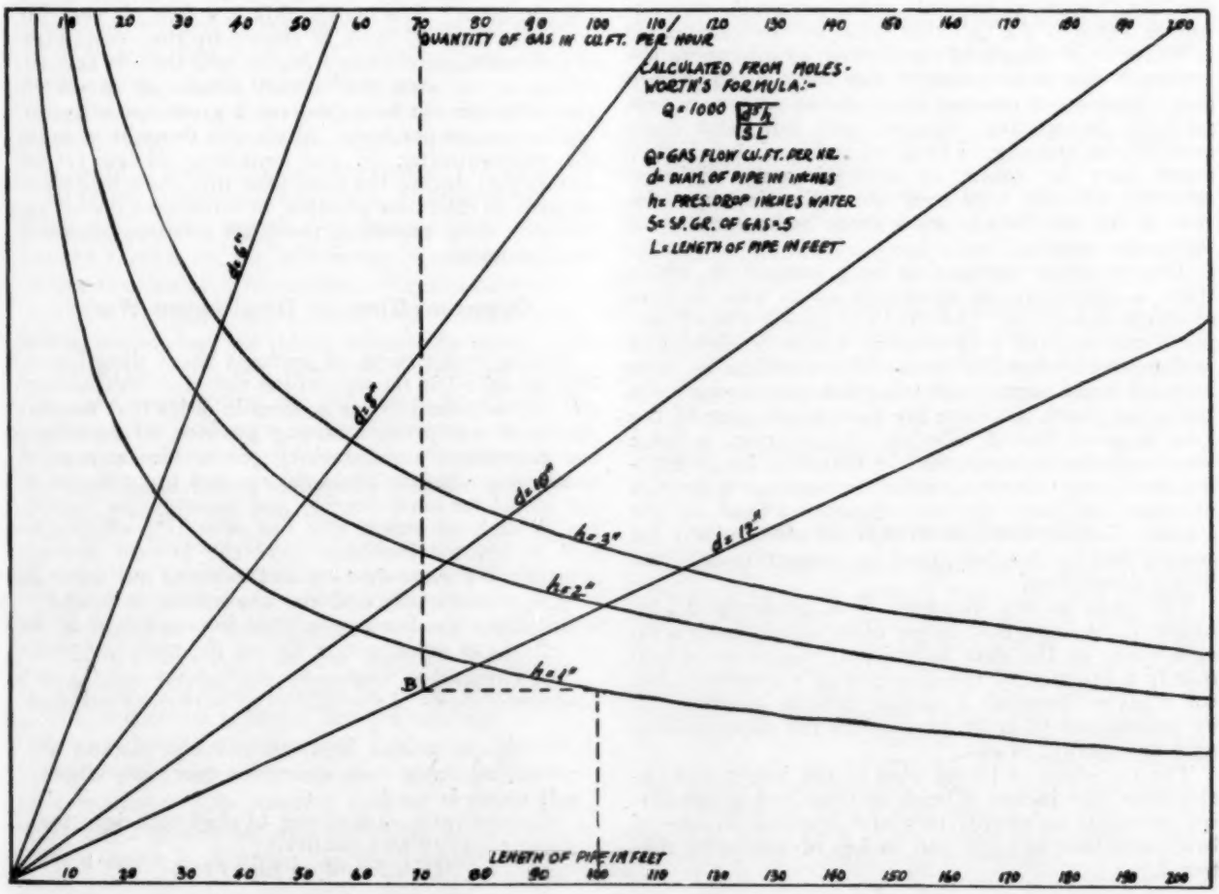
In plotting this chart a specific gravity of 0.5 was used.

As for materials used in works connections, the committee feels that this should be determined by local conditions. In places where corrosion is severe cast iron is always preferable.

In general it may be said that the apparatus of gas works should be located as closely together as possible, allowing free accessibility.

TABULATION OF DATA - WORKS CONNECTIONS 1922 P.C.G.A. SHEET 2

PLANT	NO. OF GENERATORS	DAILY CAPACITY OF GENERATORS M.C.F.	GENERATOR-WASH-BOX CONNECTIONS DIAM.	LENGTH	DAILY CAPACITY OF PLANT M.C.F.	WASH-BOX SCRUBBER CONN. DIAM.	LENGTH	SCRUBBER-RELIEF HOLDER CONN. DIAM.	LENGTH	RELIEF HOLDER EXHAUSTER CONN. DIAM.	LENGTH	EXHAUSTER-OIL SCRUBBER CONN. DIAM.	LENGTH	EXHAUSTER-PURIFIER CONN. DIAM.	LENGTH	OIL SCRUBBER PURIFIER CONN. DIAM.	LENGTH	PURIFIER-STORAGE HOLDER CONN. DIAM.	LENGTH
	3	6,000	60"x60"	10' to 15'		42"													
	1	4,000				30"													
N	1	3,500			28,500	30"	15 Av.	2-24"		1-30" 1-24"		2-24"	38'			1-30" 1-24"	200'	30"	
	1	3,500				2-20"													
O	7	4,000	43"	25'	52,750	2-42" 1-42"	225 Av. 300'	4-30"		4-30"		4-30"	150'			4-20"	200'	2-30" 2-46"	
	2	2,750	27"			1-30" 1-12"	180" 5'												
P	2	750	20"	5'	3,300	14"	14"	20"		20"		20"	41'						
	1	LB60	40"x40"	5'		36"	21'6"												
	1	250	16"	4'5"		12"	18'												
Q	1	460	16"	4'5"	1,450	12"	19'6"	12"		12"		12"-(From Relief Holder to Purifier)--300' Long						12"	
	1	790	24"	6'		20"	11"												
R	2	1,500	41"x41"	8'3"	3,000	48"	18'4"	24"		24" 18"								24"	
	1	230	16"	6'		12"	4'												
S	1	380	16"	6'	1,070	16"	5'	18" (Oil Scrubber Between Risers)				12"	40'			12"	70'	12"	
	1	460	24"	6'		20"	6'												
T	1	280	11"	3'9"	720	10"	11'6"	12"		12"	Relief Holder to Purifier			12" Diam.			303'	12"	
	1	440	15"	4'3"		12"	2'6"	12"											
U	8	1,200	36"	10'	12,000	36"	5"	30"	20	24"					20"	20		20,24&30	
	4	2,400	33"	10'		30"	10	30"	45'						30"	38"			
V	2	1,000	16"	7'7"	4,400	16"	2'6"	16"		20	16"					16"			
	2	1,200	24"	7'7"		16"	2'6"				20"					20"			



Oil Gas Generator Design

Report of an Investigation on the Subject

There has been much discussion recently regarding oil gas generators; therefore this report on the design of this type of machine is worthy of printing. The report was made by a committee to the Pacific Coast Gas Association at its recent convention. In part it was as follows:

The work of this committee was intended to embrace only appurtenances of oil gas generators and strictly not touch upon the question of types of oil gas generating apparatus.

In order to establish a starting point for the committee's work a questionnaire was sent out to all companies manufacturing oil gas on the Pacific Coast and also the Honolulu Gas Company. Answers were received from nine companies giving the detailed information asked for on the questionnaire. This information covered in detail the size of generators, thickness of plates, type of joints, size and shape of doors, throat sections in two shell types, lining and insulation, checker work, stack valve size and method of operation, blast valve, off-takes, washbox, type of burner or spray used and control boards.

The information obtained was tabulated for comparison with the idea that some general factors and conclusions could be drawn from this data which would be of value. A study of this set-up reveals the fact that about the only point on which all companies agree is the fact that straight flue checkering is better than staggered checkering, as all generators reported on, show straight flue checkering except one. Spacing of checker brick shows seventeen sets with 2½-in. spacing, thirteen with 3-in. and three with 3½-in. spacing. The average life of the checker work may be taken as approximately eighteen months, different type generators showing a variation in life of checker work from eight months to thirty-six months.

The washbox appears to be a subject in which there is absolutely no agreement as to what its size or shape should be. The Portland Gas & Coke Company has adopted a cylindrical washbox, eight feet in diameter by five feet deep. This washbox we have been informed requires cleaning but once a year. On the other hand, we have the new washboxes of the Los Angeles Gas & Electric Corporation, a large steel cylinder fourteen feet in diameter by twenty-five feet long, laid on its side. In between these two extremes we have the oval shaped washbox of the Pacific Gas & Electric Company, sixteen feet by twenty feet by five feet, used in connection with the larger generators.

The ratio of the diameter of a generator to its height is an important factor upon which there is no agreement in the data submitted. Capacity is primarily a function of the diameter of a generator but for a given diameter a certain definite height must be maintained in order to produce the required volume and quality of gas.

The thickness of lining used in the larger sets varies from nine inches of brick and one inch of insulating material to twenty-two and one-half inches of brick and four and one-half inches of insulating material.

Diameter of Stack Valve

The diameter of the stack valve is an important factor but we find no uiformity in this matter as the openings vary in size from thirty-four to forty-eight inches on the larger types of generators. This is an important subject, as a gas generator must have a certain definite back pressure in order to properly fill the entire shell during the heating period. Proper size of stack opening is absolutely essential.

The diameter and shape of the off-take seems to be an open question, as we note a variation in size and shape from thirty-inch circular to seventy-two-inch rectangular, and this in sets of nearly the same hourly capacity.

In calling attention to the above unconformity of design in details common to generators of all types of equal generating capacity, it is the desire of this committee to point out the absolute necessity for the obtaining of accurate data which can be used in designing a generator of any type. We must determine correct factors for our design, otherwise our construction is either inefficient or extravagant. Evidently some of the factors now in use are correct; others are erroneous, and the problem before us is to find out which are the correct units and discard the ones in error. We realize this is a difficult task but we must face the facts as shown by the compilation of the questionnaires and that is how little is actually known as to what the correct design of an oil gas generator should be to deliver a given quantity and quality of gas per hour. With this thought in mind, the subcommittee on gas generator design recommends that during the next year this work be carried on with all diligence possible, in order that the oil gas industry may maintain the high position which it now occupies.

Opportune Time for Development Work

During this period, of perhaps short duration, of low priced oil is the opportune time for development and improvement of our process in order that we may maintain our present strong position of supplying our consumers a satisfactory gas service at a minimum cost. Before oil again reaches the price of $2 per barrel we must develop and improve our apparatus to such an extent that our operating efficiencies will be greatly increased over the present average results. We must develop and improve our methods of gas manufacture and the committee is forced to admit there has been very little improvement in the art of oil gas manufacture during the past few years.

The committee wishes to outline for next year's program a study of the following important subjects:

Design of proper washbox and best method of protecting same from excessive corrosion where salt water is used.

Correct ratio of diameter of shell to height for given capacity and quality.

(*Continued on page* 614.)

As the Journal Views It

Gas Engineering by Correspondence

Exactly as we are devoting more attention to the intensive training of men to take up work in the gas industry in the United States so is this matter being discussed in England. In a recent issue the *Gas Journal*, of London, commenting on the need of providing opportunity for study discusses various suggestions that have been brought forth, one proposal in particular being that arrangements should be made for instruction by correspondence. It is suggested by one man that this work should be undertaken by the Institution of Gas Engineers.

Now whether such an idea would have any merit for use in the United States we are not prepared to say. We know that in different sections of the country there have been established courses of instruction which have brought out large attendance and the education given has been most practical and useful. This is particularly true of courses that have been carried on for the instruction of men in the meter department.

America, we have been told, receives much of its education via the mails and the number of students who are enrolled in the correspondence courses is enormous.

Just how a correspondence course of applied instruction in the various branches of gas company activity could be carried on, we believe, could well be subject for investigation by a committee. It might be that the American Gas Association could take up this work, offering to train any individual, whether connected with the industry or not, who would pledge himself to real study. Perhaps greater interest could be aroused in the proposition, and mere curiosity seekers kept out, if there was a small charge. We believe that it is universally recognized that a thing obtained for nothing is considered worth just that much.

We do not want to be understood as advocating that the American Gas Association take up this work, but we believe that it is worthy of thought.

It is true that in some instances certain universities and colleges have taken up the work of teaching gas engineering. We have in mind the work that is being done in connection with the Peoples company, of Chicago, and the meter instruction courses in Iowa and Massachusetts, but we believe that this can be made more extensive with splendid results. Our industry offers opportunities for any individual in any branch and our desire is to attract the finest possible body of men to our field that we can. None of us knows what the future possibilities of the gas industry are except that we are all confident of tremendous growth.

We would welcome comment on this subject.

Uniformity in Commission Rulings

Latterly there has been a noticeable uniformity in rulings by various State utility commissions, and it is worthy of comment that these changes have been in the direction of the application of common sense to the problems that are presented. For a long time there was a wide variation of rules and not all of them were in keeping with what are recognized as the best practice.

We believe that one underlying cause for this change has been the fact that public opinion has swung to the support of fair play for the utilities. It took a long time for this end to be reached and, while many companies suffered as a result of either the indifference or open antagonism of the public, we believe that to-day any company can secure support for reasonable requests.

Whether the political upheaval that took place at the last election will have any direct bearing on the attitude of the commissions when the new organizations get down to work in different States, it is too soon to say, but we feel safe in predicting that if there is any marked difference it will only be for a short time. The public has come to realize that the prosperity of a community, of no matter what size, is closely bound up in the prosperity and well-being of its public service companies.

Coals of Western Kentucky

Like the eastern interior region as a whole, of which it forms a part, the western Kentucky field produces railroad fuel chiefly, states the Bureau of Mines, in a recently issued paper on Kentucky coals, 30 to 35 per cent of the entire output of the district being used by railroads, a proportion somewhat above that for all bituminous coal mines in the United States. Little coal from west Kentucky is sold for the manufacture of gas, although about 12 per cent of it is taken by electric light and power companies. The district produces also a lump coal that finds a wide market for domestic use, and about one-fourth of the output is shipped to retail dealers. A little coking coal is produced.

Gas Ideal Fuel for Heating Furnaces

Comparisons Made by Engineer

In a paper on "Heating Furnaces for Blooms, Slabs and Billets," read before a meeting of the American Iron and Steel Institute, at New York, by W. P. Chandler, Jr., fuel experimental engineer, Carnegie Steel Company, Duquesne, Pa., interesting information was given regarding types of metallurgical heating furnaces, selection of fuels and efficiency tests. Mr. Chandler said, in part:

"I have been asked to prepare a paper on 'Heating Furnaces for Blooms, Slabs and Billets,' with special attention to fuel economy. If taken broadly, this subject would include all types of furnaces with the different methods for firing the various fuels in use. I shall, however, cover briefly the various methods of firing metallurgical heating furnaces, and describe particularly two certain types of furnaces with which I am particularly acquainted. These furnaces use by-product coke oven gas as fuel, but conclusions can be drawn from the results of tests, that may be applicable to future development of furnaces using any type of fuel in order to obtain more efficient and better heating.

Selection of Fuels

"The choice of fuels for use in heating furnaces is governed by availability and cost. When natural gas was plentiful and cheap practically no other fuel was used, but with the growing scarcity of this fuel, operators have been forced by considerations of cost and even by law to substitute other fuels.

"The gaseous fuels, such as natural or by-product gas, are ideal fuels for use in heating furnaces. They require the least amount of equipment: a gas main, regulator and burners, with necessary valves, make a complete installation. The varying demand of the furnace can readily be met with an increase or decrease in the supply of fuel, while the temperature of the furnace can be held at any point within the range required for heating steel. The most important factor governing the successful use of a gaseous fuel is the maintenance of a constant pressure on the burner valves. This can be accomplished by the installation of an automatic pressure regulator.

"Liquid fuels, such as by-product tar and fuel oil require additional equipment. A storage tank equipped with some means of heating the fuel, such as pipe coils filled with steam, a pump, pressure regulator and atomizing burners with the necessary piping and valves make up the usual installation. The atomizing burners may be of the pressure type or may require steam or compressed air, in which case a source of supply for the atomizing agent are requisite for good operation of the furnace. The main reasons these fuels have not found broader use lies in the scarcity of by-product tar and the cost of fuel oil at the main steel mill centers.

Solid Fuel

"Solid fuel in the form of coal has been used in many reverberatory heating furnaces. Originally, the firing was done by hand and the ashes removed by manual labor. The high labor cost in this country has forced the development of labor saving devices. The mechanical stoker has found ready application and many furnaces are operated in this manner at present. The installation, aside from the stoker proper, requires the addition of coal and ash handling machinery, bins and, in the case of forced draft stokers, the necessary fans and air ducts. It also precludes to a great extent the savings that can be obtained from recuperation of the air for combustion.

"Another development in the application of coal as fuel for heating furnaces has been through the use of gas producers. By this method the preparation of the fuel is removed from the furnace and the heater has to deal with only a gaseous fuel. Only about 80 per cent of the heating value of the coal is realized in the producer gas, however, and with the rapidly rising cost of coal in this country it will become more and more difficult to justify this loss. There is a large increase in the initial cost of the furnace installation to provide the producers, building, coal and ash handling machinery, gas flues and steam lines. A general estimate of the cost can hardly be made, since much depends on the individual installation. The size of the producer plant, location with reference to furnaces served, number of furnaces to be operated from one producer plant and such items require that a separate study be made for each case. The cost of operating the producer plant—that is, gasifying the coal—must be added to the fuel cost in any comparison of prices of various fuels.

Powdered Coal

"In recent years powdered coal fired heating furnaces have found favor in many plants, particularly in France. A number of problems in its use will have to be overcome successfully before its adoption will become general. Removal of the ash from the products of combustion or provision for its free passage through the furnace must be provided in order to insure uniform heating of the steel. The intense flame with its consequent cutting action on the steel must be cared for, and the gain in efficiency due to preheating the air for combustion will increase this difficulty by causing a still more intense flame. A number of methods and systems for pulverizing, conveying and firing powdered coal are on the market, and if the various difficulties can be successfully overcome, material savings in fuel may be obtained.

"The application of electrical heating in metallurgical work is comparatively new. Furnaces using electrical heat for heat treatment of steel, either as castings or forgings, are successful and on account of the accuracy with which the desired temperature may be maintained and the freedom from oxidation, it is found that it pays to use the more expensive fuel for source of heat, electricity. It is doubtful if electricity will be used to heat steel in the form of blooms, slabs and billets made of ordinary steel, except in special localities where electricity is cheap and fuel is scarce and expensive. However, where steel is placed in a furnace hot and merely receives a soaking heat, as in the case of ingots in soaking pits, the amount of electric current required

per ton of steel is small and it is probable that the saving due to freedom from oxidation or scale and from burned steel will more than compensate for the cost of the electric current. Such electrically heated soaking pits have been designed, although they are not in operation at the present time.

"The following table has been prepared to show the allowable price that can be paid for various fuels to be equivalent in heating value to natural gas at 30 cents per thousand cubic feet. The cost of preparing and firing the fuels has been added in arriving at the allowable price, but no allowance has been made for the efficiency obtained in the furnace itself. Also no charge for depreciation or interest on the initial investment has been made, since so much depends on the individual installation:

	Fuel				
Unit	Natural Gas—1,000 Cu. Ft.	By-product Gas—1,000 Cu. Ft.	By-product Tar—1 Gal.	Fuel Oil—1 Gal.	Coal as Producer Gas—1 Gross Ton
B.t.u. per unit delivered at heating furnace	950,000	496,000	156,000	137,600	24,192,000
Equivalent of 1,000 cu. ft. of natural gas	1,000	1,915	6.09	6.90	0.03926
Cost of preparing per unit	....	....	$0.00023	$0.00023	$1.60
Cost of firing per unit	....	....	0.005	0.004	.....
Total cost of equivalent of 1,000 cu. ft. of natural gas	$0.30	$0.30	0.30	0.30	0.30
Cost above fuel of equivalent of 1,000 cu. ft. of natural gas	....	....	0.0304	0.0276	0.0628
Allowable cost equivalent of 1,000 cu ft. of natural gas	0.30	0.30	0.2696	0.2724	0.2372
Allowable cost per unit to be equivalent to coal cost of 1,000 cu. ft. of natural gas	0.30	0.157	0.44	0.040	6.04

Types of Furnaces

"There are two main types of furnaces in use for heating blooms, slabs and billets—the continuous and the non-continuous. The latter is similar in construction to the Siemens open-hearth furnace, the direction of the gas flame across the hearth is periodically reversed and the furnace is usually equipped with regenerative checker chambers for preheating the air used for combustion. The blooms or slabs which this type of furnace usually heats are charged on the hearth of the furnace, and remain in the one place till hot enough to roll. The continuous furnace is not reversed, the flame always traveling in the one direction, while the steel usually in the form of billets, passes through the furnace in the opposite direction. The cold billets enter the furnace at the coolest point and are pushed forward to the point of maximum temperature where they are discharged to the rolls. In the continuous furnace the billets lie tight together on the skids, forming a large steel plate on the floor of the furnace. Only the top of the billet is exposed so that all the heat required to bring the steel to rolling temperature must be absorbed by this surface. In the non-continuous furnace there is an open space between the blooms, so that three sides are available for directly absorbing the heat from the products of combustion or roof, while the fourth side is resting on the heated hearth of the furnace and absorbs from it a large amount of heat.

"The time required for heating billets, slabs or blooms depends on the temperature of the heating medium, the surface of the steel exposed and the thickness of the steel. The temperature of the continuous furnace is at a maximum only at the discharge end and gradually decreases to the rear, while only one side of the billet is available for absorbing heat. In the non-continuous furnace the temperature is at the maximum throughout and three sides of the billet are available for absorbing heat. It is evident, therefore, that the same sized billet must remain longer in the continuous than in the non-continuous furnace. The dimensions of the non-continuous furnace do not affect directly the time of heating, but in the continuous furnace, with the rolling mill handling a given number of bars per hour, the length of the furnace fixes the time of heating. With everything else the same, the time of heating in a continuous furnace varies as the square of the thickness of the billet, so that a five-inch square billet requires four times as long as a two and one-half inch square billet. This means that for the larger sizes of billets long furnaces are required to give the capacity required by the rolling mill. For blooms and slabs the general practice so far has been to use non-continuous furnaces, but for five by five inch billets and smaller the continuous furnace proves very satisfactory.

"Certain of the alloy and spring steels, if heated too rapidly, tend to crack, so that care must be used in bringing such billets up to rolling temperature. The continuous furnace fits this class of steel admirably since the billet enters a relatively cool part of the furnace and is gradually heated to the temperature required for rolling."

Analyses of Alabama Coals

In preparation for a report on analyses and characteristics of Alabama coals, field representatives of the United States Bureau of Mines have taken 376 coal samples from 79 mines in that State.

Oil Gas Generator Design

(*Continued from page* 610.)

Size of blast valve, correct blast pressures, and diameter of stack valve opening.

Best method of protecting steel bottom of generators.

Investigate checker brick results and determine, if possible, the rate of absorption and giving up of heat of different kinds of firebrick.

Investigate various types of oil tables and control boards and also proper meters for measuring oil, air, steam and gas in order to improve operating efficiencies.

These are just a few of the more important subjects for investigation which show what a wide field must be covered in order to standardize our operations.

Heat Distillation of Coal

In the general study of the heat of distillation of coal, being conducted at the Pittsburgh, Pa., Experiment Station of the Bureau of Mines, the problem of the effect of the inert atmosphere in which the distillations are conducted has been studied. In a series of special tests, atmospheres other than nitrogen and hydrogen were tested. Illinois coal which gave 60 c.c. of gas and an exothermic reaction of 22.5 cal. at 600 deg. in nitrogen gave, in hydrogen, an endothermic reaction of 12 cal. with gas absorption amounting to 60 c.c. All other coals of the series gave gas evolution in nitrogen and gas absorption in hydrogen. This means that the net reaction heat during distillation is dependent on the partial pressure of hydrogen in the reaction products. This heat effect with hydrogen is regarded as the most important development of the whole research.

Sampling Delivered Coal

In sampling delivered coal the Bureau of Mines follows a definite procedure. A sample weighing not less than 1,000 pounds is systematically collected by taking equal increments at regular intervals throughout the delivery, while coal is being loaded or unloaded, and crushing and reducing this sample by successive stages to laboratory size. In using analyses of samples of delivered coal, the reader must recognize that the coal is not always of uniform size, and that the impurities are not uniformly distributed throughout the mass. Some variation in the results obtained are consequently to be expected; if the same mass of coal were sampled a number of times the analyses would not agree absolutely except by chance. It is only when a considerable number of such analyses are available representing a considerable tonnage mined over a period of time that the average value and range of variation of a particular coal become known with assurance. With reasonable tolerances, however, for these variations, delivered coal can be sampled accurately enough for all practical purposes. Deliveries from any one mine may vary in quality from time to time because of changes in mining or preparing the coal, and an analysis of deliveries for any one date should not be considered as establishing a permanent standard, for the output may be greatly improved by new methods of mining and preparation, or it may deteriorate through the carelessness of the miner and the operator.

Carbonized Lignite Fuel

The vertical carbonizing oven, constructed at Grand Forks, N. D., in the course of a co-operative investigation by the University of North Dakota and the United States Bureau of Mines looking toward the commercial utilization of the northwestern lignites, has recently been operated under the supervision of W. W. Odell, fuel engineer, of the Bureau of Mines in the manufacture of lignite char on a commercial scale. Results were very satisfactory, and valuable information on the production of lignite char without the recovery of by-products was obtained. The cost of producing this char was reduced considerably below the cost of operation in the carbonizing oven used in 1921. A satisfactory grade of char was produced. Grates for the utilization of this char in the ordinary magazine-feed house-heating stove and for a house-heating boiler have been made at Pittsburgh and sent to North Dakota for distribution to domestic consumers.

Method of Collecting Mine Samples

The method of collecting mine samples of coal by the Bureau of Mines involves selecting a representative face of the bed to be sampled; cleaning the face; making a cut across it from roof to floor, and rejecting or including impurities in this cut according to a definite plan as they are included or excluded in mining operations; reducing this gross sample, by crushing and quartering, to about three pounds; and immediately sealing the three-pound sample in an air tight container for shipment to the laboratory.

Coal Development in Eastern Kentucky

The coals of eastern Kentucky, when mixed with the proper proportion of low-volatile coal, are peculiarly suited to the manufacture of by-product coke, states the Bureau of Mines, in Technical Paper 308, just issued. An investigation made by the engineers of the United States Fuel Administration showed that in 1917 87 per cent of the northeast Kentucky production, 52 per cent of the Hazard production and 44 per cent of the production of southeast Kentucky was suitable for making such coke. Largely as a result of the expansion of the by-product coke industry, the production of coal in eastern Kentucky has grown by leaps and bounds. In fact, the field has developed more rapidly than any other major field. The average output for 1916-1720 was more than thirteen times as great as the average for 1890-1900, whereas the growth in bituminous output as a whole during the same period was less than fourfold. One consequence of this extraordinary growth has been a development of mine capacity far in excess of the ability of the railroads to transport, so that eastern Kentucky is the scene of chronic transportation difficulties whenever the demand for coal is active.

Lignite Char Experiments

In the course of tests made at Pittsburgh, Pa., by the United States Bureau of Mines, lignite char has been found to burn to a gas containing a higher proportion of carbon monoxide than that from coke. To determine if this relatively high carbon monoxide content with lignite char is to be attributed to the smaller size of the char, coke of the same size as the char will be burned on the next tests.

Public Utilities Securities Market Report

Prices of Representative Gas Bonds

(Quotations furnished by The National City Company)

Company		Maturity	Nov. 23, 1922 Bid	Asked
American Lt. & Trac. Co.	Five Year 6s	May 1, 1925	109½	110½
Brooklyn Union Gas Co.	First Consol. 5s	May 1, 1945	95	95¾
Columbia Gas & Elec. Co.	First 5s	May 1, 1927	95	97
Consol. Gas, Elec. Lt. & Pr. Co. of Baltimore	First Ref. 7½s	Dec. 1, 1945	110	111
Consol. Gas, Elec. Lt. & Pr. Co.	General 4½s	Feb. 14, 1935	90	92
New Amsterdam Gas Co.	First Consol. 5s	Jan. 1, 1948	84	86
Denver Gas & Elec. Co.	Gen. (now 1st) 5s	May 1, 1949	93	95
Detroit City Gas Co.	Gold 5s	Jan. 1, 1923	99⅞	100
Equitable Illum. Gas Lt. Co. of Philadelphia	First 5s	Jan. 1, 1928	99½	102
Hudson County Gas Co.	First 5s	Nov. 1, 1949	92	94¼
Laclede Gas Light Co.	Ref. & Ext. 5s	Apr. 1, 1934	91	95
Louisville Gas & Elec. Co.	First & Ref. 7s	June 1, 1923	100	100¾
Michigan Light Co.	First & Ref. 5s	Mar. 1, 1946	91	92
Milwaukee Gas Light Co.	First 4s	May 1, 1927	91½	92½
Pacific Gas & Elec. Co.	Gen. & Ref. 5s	Jan. 1, 1942	91	91½
Pacific Gas & Elec. Co.	First & Ref. 7s	Dec. 1, 1940	105½	—
Cal. Gas & Elec. Corp.	Unif. & Ref. 5s	Nov. 1, 1937	95	96
Peoples' Gas Lt. & Coke Co.	Refunding 5s	Sept. 1, 1947	89½	93
Chicago Gas Lt. & Coke Co.	First 5s	July 1, 1937	95	97½
Portland Gas & Coke Co.	First & Ref. 5s	Jan. 1, 1940	91	—
Seattle Lighting Co.	Refunding 5s	Oct. 1, 1949	82	84
Southern California Gas Co.	First 6s	Nov. 1, 1950	98	99
Utica Gas & Electric Co.	Ref. & Ext. 5s	July 1, 1957	91¼	—
Washington Gas Light Co.	General 5s	Nov. 1, 1960	94½	95½
Western States Gas & Elec. Co. of California	First & Ref. 5s	June 1, 1941	91	93

To Vote on Proposed Stock Increase

Stockholders of the Apex Electrical Manufacturing Company, of Cleveland, Ohio, will be given an opportunity on Dec. 14 to vote on a proposed increase of the company's no-par common stock from 30,000 shares, the present authorized number, to 75,000. In event the increased capitalization is authorized at the special meeting of the stockholders, the board of directors announces a plan to declare and distribute out of such increase a stock dividend of 100 per cent, on the basis of one share of the new stock issue for each outstanding share of the present capitalization. The surplus represented by this stock dividend and transferred from the surplus to capital account will, it is estimated, be between $250,000 and $300,000.

Profits of the Apex Electrical Manufacturing Company for the first nine months of this year amount to considerably more than half a million dollars, the sales for that period aggregating $3,164,-019.45, as compared with total sales during 1921 amounting to $2,710,-204.40. The directors, in a letter to the stockholders advising of the proposed stock increase, report that the company's business has been expanding so rapidly that its current profits above the cash dividends at the current rate are needed for the business and cannot be distributed among the stockholders in cash, and it is therefore desired to make a part of these earnings more available to the stockholders without impairing the property and working capital necessary to its business by the declaration of a stock dividend.

Louisville Gas & Electric Co. Interest Reduced by New Financing

Louisville Gas & Electric Company will benefit to the extent of more than $150,000 annually in reduced interest charges on its total funded debt, as a result of recent new financing. A new issue of $3,-500,000 of the company's 6 per cent sinking fund gold debenture bonds, series "A," maturing Oct. 1, 1937, are being offered by a syndicate headed by H. M. Byllesby & Co. The bonds are priced at 96½, yielding over 6.35 per cent, and, like the company's new issue of $18,805,000 first and refunding mortgage bonds offered a week previous, were quickly taken.

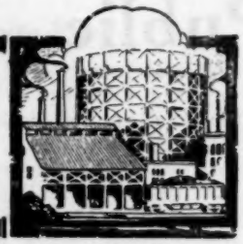
Net earnings for the twelve months ended Sept. 30, 1922, as applied to the new financing, were, after deduction of prior annual interest charges, over seven times annual interest charges on the debenture bonds and were more than twice annual interest charges on the total funded debt of the company.

In connection with the new financing it is interesting to note that the Louisville Gas & Electric Company has been remarkably successful in building up a large number of home shareholders by the operation of the customer ownership plan of selling its 7 per cent preferred stock direct to its patrons. Customer ownership activities in Louisville were begun in Nov., 1919. The record of preferred stock sales by years, up to Nov. 1, 1922, follows:

1919	$ 215,900
1920	695,000
1921	901,600
1922	1,678,900
Total	$3,491,400

It is a noteworthy feature that the stock invariably has been sold at par —$100 a share—plus accrued dividends. There are now upward of 4,000 local holders of this stock, receiving dividends quarterly.

NEWS OF THE GAS INDUSTRY



Proposoes to Eliminate Service Charge

Berwick, Pa.—That the Berwick Gas Company is making plans to eliminate the readiness to serve charge that was the subject of an extended contest before the Public Service Commission covering a period of three years, was the statement given out from the office of the company following a visit of Dr. E. S. Snyder, of Lancaster, vice-president of the company and chief executive of the bondholders' committee.

A change in policy with a desire to improve the service and win back the confidence of the public has been apparent since the location here of A. A. Whitlock, as local manager. At the recent reorganization of the company and meeting of the board of directors Mr. Whitlock was made general manager of the company.

Dr. Snyder declares that the bondholders' committee plans big things for the local company. The impression he left on those who met him during his visit was highly favorable from the standpoint of his energy and the tone of his references in relation to the local gas service and its continued improvement. The other members of the bondholders' committee are F. H. Mancil and Carl W. Fenninger.

At the conference here with manager Whitlock better gas, better service, and that which in view of the long contest will have a decided result when carried into effect, cheaper gas rates, were the subject of discussion. The management is strongly in favor of the elimination entirely of the readiness to serve charge and declare this will be done as soon as enough business is won back to enable the company to undertake such a change. Old customers, it is stated, have been gradually coming back since the change in company management and policy. A step in this direction has been the establishment of a "service department" for the purpose of adjusting back claims of those who consider that at one time or another they did not get a square deal. Former customers have been invited to reopen these former differences and to have them adjusted.

New equipment is to be installed at the plant to enable gas to be made more economically and efficiently. The first installments will include a boiler feed water heater and a new gas testing apparatus. A new 100,000 cu. ft. gas holder is planned for the spring, the site for such equipment on the lots adjoining the plant having been recently purchased from S. C. Jayne.

Installing Power Driven Regulators

The Gas Machinery Company, of Cleveland, Ohio, has received order for power driven pressure regulator to operate in connection with gas retorts in the gas plant of the Philadelphia & Suburbs Gas Company, at Chester, Pa.

R. L. Clarke Dies; Thirty-five Years in Gas Business

R. L. Clarke, assistant manager of the San Diego Consolidated Gas & Electric Company, died Nov. 8 after an illness of two months. Mr. Clarke had been identified with the gas manufacturing business in San Diego for more than thirty-five years. He was with the San Diego Consolidated Gas & Electric Company since its purchase by H. M. Byllesby & Co. in 1905.

Can't Furnish Gas for Heating Homes

Albany, N. Y.—The Public Service Commission has directed that, effective Dec. 1, the Republic Light, Heat & Power Company discontinue furnishing gas to its customers for house heating by hot air, hot water, steam or vapor furnaces and for industrial purposes of any nature in Dunkirk, Forestville, Silver Creek, Sheridan, Hanover, Portland, Pomfret, Westfield, Chautauqua, Chautauqua Corporation, Brocton Ferdonia, Farnham and other towns served by the company. The order further provides that an and after Dec. 10, 1922, the company is empowered to shut off the supply of gas from all customers who have failed to discontinue the use of gas for the above purposes. The order is to contnue in effect until the further order of the commission.

This order was made under a complaint by the city of Dunkirk, alleging that the service by the Republic company in the distribution of natural gas was inadequate and asking that the company be compelled to maintain a four-ounce pressure. The order followss a series of conferences between the representatives of the company and the city and the commission. The investigation revealed that the supply of natural gas available to the Republic company is inadequate to meet all demands made upon it by customers and conservation is necessary in order that the available gas may be used for lighting and cooking.

Petersburg Company Is Increasing Plant

The Gas Machinery Company, of Cleveland, Ohio, is in receipt of contract for new six-foot water gas generating equipment and auxiliary machinery, which will be erected in the plant of the Petersburg Gas Company, Petersburg, Va.

This equipment will be installed alongside of the water gas set that was furnished by the Gas Machinery Company in Petersburg several years ago.

Examination for Meter Tester

The Civil Service Commission of New York State has announced an examination to be held on Dec. 16 for a gas meter tester. The position pays $1,300 to $1,400 per year. Applications, which must be returned before Dec. 6, can be obtained from the State Civil Service Commission, Albany, N. Y.

New Window Display Idea

J. P. Conroy, of the J. P. Conroy Sales Company, New York, Eastern distributor for Ray-Glo gas heaters, has devised and completed an electric lighting system for the display of radiant gas heaters in show windows and elsewhere, so that they give all the appearance of the heater lighted and in full operation, but without the use of flame or heat. Mr. Conroy has accomplished this by taking an ordinary Christmas tree lighting outfit and removing the burner tips from the burners of the Ray-Glo gas heater and fitting in the opening where the burner tips have been removed the sockets of the Christmas tree outfit, which are used in sets of seven, eight and ten, more or less. In each socket is set a small colored electric bulb (red or orange preferable), then the regular radiants of the heaters are set back in place, over the small electric bulbs fitting just inside of the radiant at the lower edge. When the current is turned on the bulbs light up and make the entire interior of the radiants glow with a firelike effect, giving every indication that the heater is in full operation In fact, the illusion is so perfect that Mr. Conroy was informed by his neighbors in the vicinity, and even the fire department, that he had gone away and left the heaters burning in the window and, fearing this might cause a fire, they even telephoned him at his own home.

Mr. Conroy's idea is unique and practical, because it enables gas companies to trim their windows with any number of heaters, fitting them in fireplaces and elsewhere, lighting them and leaving them glowing all night.

The nearest operation to this system heretofore has been to take a long electric bulb and make a semicircle reflector and place it on the front of the fire or near the front, so that when lighted it will reflect up against the radiants, giving an effect of being in operation. Mr. Conroy's idea makes the illusion perfect.

Lincoln Gas Company Sold

Purchase of the Lincoln (Neb.) Gas & Electric Company from the Cities Service Company by the Continental Gas & Electric Corporation has just been announced by Rufus E. Lee, president of the Continental. The purchase price has not been announced. The Continental company, it is stated, has already started plans for the enlargement of both the power and glass plants of the Lincoln company. A transmission line is being surveyed from Lincoln to York, and some of the water-power generated at the Barnestown plant will be transmitted to Lincoln over this line.

New Refractory Brick

The American Refractories Company, Pittsburgh, Pa., announces that it has perfected a line of super-refractory brick and super-firebrick and a protective coating and mortar, and is now turning out these products in quantities. It is claimed for the new super-refractory, which is called "Arcofrax," that whether in brick or in pulverized form it has withstood temperatures in laboratory tests of 2,000 deg. Cent. or 3,600 deg. Fahr. The material has a slightly basic reaction and, as it contains no free silica, is highly resistant to slightly basic slags and oxides. A typical analysis of the brick is as follows:

Alumina	84.52
Silica	10.08
Iron oxide	1.50
Lime	0.11
Magnesia	0.22
Titania	3.01
Alkalies	0.54
	99.98

It has a low coefficient of expansion and will not spall under moderate variations in temperature. Its expansion upon heat application—0.04 per cent at 2,552 deg. Fahr.—is only enough to tighten up a wall or arch. It does not shrink at high temperatures, and this means stability in walls and arches.

A super-firebrick, produced under the brand of "Arco" and having an alumina content of from 60 to 62 per cent and a melting point of 3,450 deg. Fahr., is specially adapted to furnaces using temperatures. This product is particularly designed to withstand not only high temperatures but excessive thermal shock. It has proved particularly valuable in furnaces which are subject to rapid fluctuations of temperatures, such as heating and welding furnaces, and for boiler settings where forced draft is used.

Financial Statements

Stock of the Standard Oil Company of Kansas is being offered at 42½. The earnings of this company in the period 1916 to 1921, inclusive, have averaged $1,325,000 a year. In 1921 the company made 10½ per cent, and during the past five years Standard Oil of Kansas has paid dividends of 24 per cent. Balance sheet of Dec. 31, 1921, showed a surplus of $6,700,000.

Standard Oil of Nebraska has declared the regular semi-annual dividend of $5 a share and an extra dividend of $10 a share, payable Dec. 20 to stock of record Nov. 22. This restores the annual rate of $20 a share, which was paid for several years until 1920, when it dropped to $10.

Directors of the Continental Oil Company have declared the regular quarterly dividend of $2 a share, payable on Dec. 15 to stockholders of record of Nov. 23.

The Standard Oil Company of New Jersey has declared the regular quarterly dividend of $1.25 on the common and $1.75 on the preferred, both payable Dec. 15 to stock of record Nov. 25.

In the special meeting called, the directors also declared a stock dividend on a basis of four shares of new common for each $25 par common now outstanding, payable Dec. 20 to stock of record Nov. 25.

The Phillips Petroleum Company has declared a regular quarterly dividend of 50 cents a share on stock of record Dec. 15, payment to be made Jan. 2.

To Increase Fuel Stock

On Dec. 11 the directors of the National Fuel & Gas Company will hold a special called meeting of stockholders to consider increasing the capital stock from $32,000,000 to $37,000,000 and distributing a stock dividend of 100 per cent, giving one additional share for each one on record as of Dec. 15. Of the present capitalization, $18,500,000 is outstanding. Directors state that no material increase in the aggregate dividends might be expected in the near future, as earnings do not warrant such expectation.

Aldermen Visit New Gas Plant

Ironwood, Mich.—Members of the city council and other city officialss made an inspection of the work accomplished at the city gas plant during the last several months and learned that the local plant has now a practically unlimited capacity.

"Ironwood now has in operation one of the best equipped gas plants in this section of the State, if not the best," according to Fred W. Freese, consulting gas engineer, of Chicago, who supervised the work done here and who for many years has been engaged in directing the construction and operation of gas plants.

The aldermen also learned that the Ironwood plant has a capacity that could easily furnish gas to Hurley, Ironwood, Bessemer and Wakefield, should the city authorities negotiate to give gas service to Bessemer and Wakefield.

Mr. Freese came here in April at the request of S. W. Walker, superintendent of the gas plant, to look over the plant and make such suggestions as, in his opinion, would make it more efficient for serving its consumers. Mr. Freese prepared plans and specifications which were accepted May 23, and he was instructed by the city council to carry out the plans and specifications.

The changes included the installation of one 100,000 cu. ft. capacity two-lift gas holder in steel tank, on a concrete foundation; one five-foot modern water gas set equipped with a Sturtevant steam driven turbine blower, steam driven oil pump, steam coke hoist, air and steam meters and pyrometer; one No. 4 Root's exhauster with self-oiling device, also fitted with ten-inch by-pass.

The work of the exhauster is to take the gas from the relief holder and pass it through the purifiers, station meter and into the storage holder.

There is also one 14,000-gal. capacity oil storage tank.

The old gas holder, which was in bad shape due to having been practically wrecked by ice forming in the tank several winters ago, has been put into perfect condition and is as good as new. It is now used as a relief holder in order that the gas may be better cooled before going to the purifiers.

The old water gas set has been entirely overhauled, including new linings, new generator bottom, new ash and clinkering doors and door frames, oil spray, blast valves and blast piping which makes the set equal to a new one of the same size, according to Mr. Freese.

In adding the new storage holder, it became necessary to use the old holder as a relief holder and this necessitated an entire change in the yard piping, and the installation of new valves in the inlet and outlet of the old holder. This makes it possible to use either holder by itself in case one of them is put out of commission due to an accident or other reason, said Mr. Freese.

In addition, it was later decided that a new eighty horse-power boiler should be installed, as it is of vital importance to keep the water in the gas holder tanks from freezing. The amount of water in the two tanks is over 1,000,000 gal. and with severe winters the old boilers would be too small.

The brick building has been put into first class condition. Doors, windows and cement floors have been made like new so that, in the opinion of the consulting gas engineer, "the gas department of Ironwood, as well as the citizens can well afford to be proud of their plant. They now have capacity to make 250,000 cu. ft. of gas per day."

Mr. Freese personally conducted the city officials through the plant. The party included Mayor James A. O'Neill, Aldermen W. O. Trezise, Thomas J. Stevens, William Stephens, E. F. Lesselyong, J. P. Drazkowski, H. C. Jussen, Charles Seaman, Fire Chief Ernest Dear and Superintendent W. S. Walker of the gas department.

Brooklyn Gas Company May Take Over Queens Branches

Brooklyn, N. Y.—The stockholders of the Brooklyn Union Gas Company, at a meeting called for Nov. 29, will vote on the proposition of extending the charter powers of the company to do business in Queens.

This means, if the stockholders vote in favor of the plan, that the Brooklyn Union's subsidiaries, the Jamaica Gas Light Company, the Newtown Gas Company, the Richmond Hill & Queens Gas Light Company and the Woodhaven Gas Light Company will be merged with the parent company.

At present these subsidiaries are buying gas from the Brooklyn Union. Last year the Brooklyn Union sold 2,353,162 cu. ft. of gas to the four companies.

H. E. McGowan, secretary of the Brooklyn company, in speaking about the contemplated mergers, said that in case it is decided to merge with the Queens subsidiaries, the latter companies will go under the name of the Brooklyn Union Gas Company.

Under its present charter, the Brooklyn Union Gas Company cannot operate directly in Queens County, but there is no restriction on its ownership of subsidiaries supplying Queens with gas.

Many considerations, including mains in Brooklyn streets adjacent to the county line, facilities for manufacturing gas individually if this were to be undertaken by subsidiaries, as well as the steady growth of the Queens territory, led to the movement for acquisition of the subsidiaries, Mr. McGowan said.

Further economies could be effected by merging the subsidiary companies with the parent organization, it is contended, such as simplification of financing.

In a statement by the Public Service Commission a few weeks ago, reference was made to the "disturbing influence" of a large number of gas companies operating as independent corporations but controlled by one company.

"This is particularly important as it affects the Brooklyn subsidiary companies," the statement said, "because some of them have not been sufficiently independent financially to undertake extensions and improvements that have been demanded by the public in the suburban districts."

Stockholders of record of Nov. 15 may vote on the merger proposition on Nov. 29.

Anthracite Shipments During October

October anthracite shipments amounted to 6,567,928 tons, an increase of 695,145 tons over 1921 and the largest October output since 1919. All companies except Delaware & Hudson made a gain over 1921.

Colorado Incorporation

The Skinner Chemical Production Company has been incorporated for $300,000. The incorporators are Thomas M. Skinner, John M. Alexander and Albert K. Rose. Home office is in Denver.

Rate Discussion Unsettled

Des Moines, Iowa.—The city council failed to reach any agreement in a conference with Corporation Counsel John Halloran looking toward fixing a lower gas rate.

Mr. Halloran informed the council that the gas company has offered to come down two cents on the figure of $1.20 a thousand feet proposed several days ago. Their new proposition made to Halloran was $1.18 a thousand and a license fee of 2 per cent.

Mayor Garver contended that probably the best the city would do would be a rate of $1.15 and 2 per cent license fee, but MacVicar held out for $1.10. Action was put off till Thursday.

Halloran declared it doubtful if the city could enforce a $1.10 rate at the present price of gas manufacture. He pointed out that the gas company uses 18,000 tons of coke annually at a cost of nearly $12 a ton, and that coke, oil and coal are still double the pre-war price.

Halloran's valuation on the gas was $3,240,960, which was arrived at by taking Prof. Edward Bemis' figure of $2,500,000, set a year ago, and adding the cost of improvements made since.

The license fee at present is 1 per cent and brings the city $15,000. Mayor Garver wants it doubled.

The council was reminded that any rate set by the council will be temporary. A maiority of the council want to set the gas rate at a figure that will avoid litigation with the gas company till next year, when experts can be hired to determine an equitable rate.

New Gas Plant to Be Built in 1923

Rochester, N. Y.—A new water gas plant, to be constructed on the west side of the Genesee River, below Platt Street, with a capacity of from 4,000,000 to 5,000,000 cu. ft. of gas a day, will be erected during the summer of 1923, Joseph Haftenkamp, superintendent of the gas department of the Rochester Gas & Electric Corporation, announced. The present water gas plant at East Station probably will be scrapped, although part of the equipment may be retained for emergency service.

At present the coke used in the manufacture of water gas is removed from the coal gas retorts, quenched with streams of cold water, and conveyed to the water gas station. It must again be heated in brick-lined retorts as a preliminary step in the manufacture of the water gas. These three steps will be largely eliminated when the new station is completed, Mr. Haftenkamp pointed out, and the red-hot coke will be placed in the nearby water gas retorts without passing under the quenching shower. Other refinements will be adopted in order to make the process of manufacture as economical as possible.

The proposed plant does not represent an enlargement of the water gas facilities of the company, as the present station is equipped to produce about 5,000,000 cu. ft. a day. Expansion to take care of increased demand will be along the lines of additional coal gas equipment, although parts of the present water gas plant may be retained for emergency production.

Negotiating Purchase of Plant

Lincoln, Neb.—The Continental Gas & Electric Corporation of Omaha is negotiating for the property of the Lincoln Gas & Electric Company, in Lincoln. It is understood that a ten days' option has been secured on the property and that the option will be exercised shortly.

The option, it is understood, was taken in the name of the Nebraska Gas & Electric Company, a subsidiary corporation, and will be closed, if negotiations are completed, in that company's name.

President Sharp of the Lincoln Traction Company admitted that the traction company had been negotiating with the gas company, but said negotiations between the two Lincoln companies ended ten days ago. "Since then I have known nothing about negotiations between the gas company and other parties," he said.

The Continental company has shown much interest in the Nebraska field and is planning transmission lines which will connect a number of cities and power plants to be located on the Blue near Beatrice, on the Loup, Elkhorn and Cedar rivers.

A representative of the company has explained that the Nebraska Gas & Electric Company, a subsidiary of the Continental, plans considerable improvement to the Lincoln plant. The Lincoln plant now rated at 5,000 K. W. H. will be doubled in capacity if the deal goes through. The transmission lines will radiate from Lincoln. The Continental now owns and controls plants in 135 towns in Iowa, Nebraska, South Dakota and Missouri. The company is now supplying service at Beatrice, Wymore, York, Geneva, Aurora and Norfolk, and the Beatrice-Norfolk transmission line is now nearing completion. The York, Beatrice and Plattsmouth lines will run out of Lincoln.

Asks for Franchise

Salt Lake City, Utah.—The initial step toward supplying Salt Lake and Ogden with natural gas from Wyoming has been taken by F. E. Hurley, of Findlay, Ohio, and John C. Howard, of Salt Lake City, who have filed applications with the city commissions of Salt Lake and Ogden for franchises permitting the distribution of natural gas. Members of both commissions assert that the applications so far have been filed informally to permit study and investigation before coming before the commissions for official action. It is the understanding, however, that formal presentation of the applications will be made at any time the commissions are in a position to enter into official discussion.

While it is not so stated in the applications, it is understood that Mr. Hurley represent the Ohio Oil Company, of which he is vice-president in charge of Rocky Mountain operations, and that Mr. Howard represents the Midwest Refining Company through its affiliated company, the Utah Oil Refining, of which he is president.

Oral statements made in connection with the filing of the petitions, commissioners assert, backed by Ohio Oil and Midwest Refining or Utah Oil Refining interests, which will construct a pipe line from Baxter Basin, south of Rock Springs, to Salt Lake and Ogden and possibly other Utah cities. The pipe line will be approximately 220 miles long, consisting of one main line from the field to Coalville and branches from there to Salt Lake and Ogden.

With The Equipment & Appliance Manufacturers

Conducted by Business Department of American Gas Journal

Rotary Displacement Meter

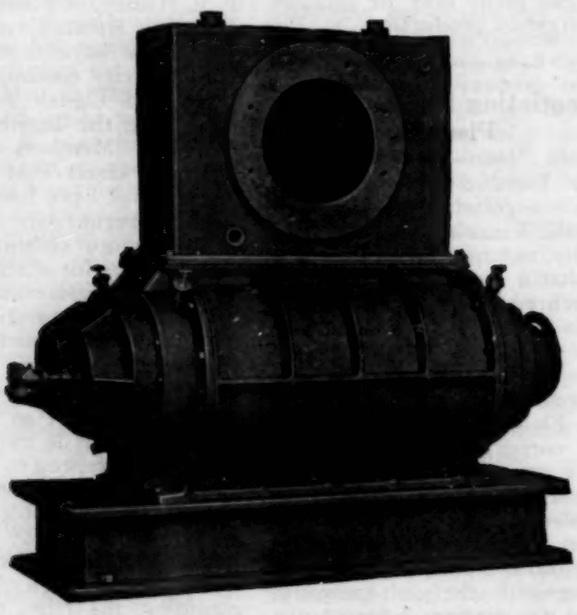
The Connersville (Ind.) Blower Company, in Bulletin No. 4, describes its rotary displacement meter, cut of which is shown herewith. The company states:

"We have designed, and are manufacturing, meters which fill the requirements for measuring both natural gas and artificial gas from coal, water or coke oven plant and for accurate, reliable results.

"While constructed along general lines similar to the Connersville blowers and gas exhausters, these meters contain improvements and refinements brought out during the past three years of development work.

"The ability of the rotary displacement meter to measure the flow of gas or air is based on the fact that this type of machine displaces a known quantity at each revolution.

"A counter is furnished which registers the revolutions of the meter. When these revolutions, recorded by the operator, are multiplied by the meter displacement, and to the net volume thus recorded is added the slip of the machine, the result is an accurate record of the amount of gas passed. A twenty-six-day test of one of these instruments in series with a wet drum meter which had been carefully calibrated showed a variation considerably less than 1 per cent.



Connersville Rotary Displacement Meter

"Only a slight differential in pressure between the inlet and outlet is required to cause rotation of the meter, the friction loss in the machine being practically negligible. The differential within the limits of speed for which the machines are normally recommended does not exceed 1 in. of water, varying through a range of one-tenth to 1 in. differential. At this slight differential the variation in the correcting volume to be added to the volume recorded by the revolution counter is very small and is accurately determined by calibration and test of the meter before shipment is made.

"The meters are designed to receive the gas at the top and discharge at the bottom, making the direction of rotation of the impellers or revolving parts of the machine downward. This cleanses the internal parts of the instrument from any impurities which may be carried in suspension in the gas metered, permitting the meter to be used for the measuring of crude gas.

"Another advantage of the rotary displacement meter is the ability to measure crude gas as well as finished gas. This will enable the operator of a mixed gas plant to know the proportions of each gas by having a meter in each line."

Link-Belt Portable Loader Catalogue No. 550

A new Link-Belt portable loader catalogue has just been issued by the Link-Belt Company, Nicetown, Philadelphia, Pa., embracing its entire line of portable equipment. Copies can be obtained by addressing the manufacturers.

The book is the most up to date and complete ever issued by this company. It is 8½ by 11 in size, and contains complete specifications of all of the standard machines, which include the large one-man power swiveling loader, the portable belt conveyor, the standard Type "A" machine for anthracite coal and the "CS" loader for handling sand and gravel.

Gas Main Completed

McKinney, Texas.—The gas main from Prosper to Celina has been completed. A force of 110 men have been at work on the project for several weeks. It was connected up with the McKinney-Denton main line at Prosper.